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AF/2811

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of

ROBERT H. HAVEMANN ET AL.

Serial No. 09/216,214 (TI-21570)

Filed December 18, 1998

For: ENHANCEMENTS TO POLYSILICON GATE

Art Unit 2811

Examiner T. Tran

Customer No. 23494

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SECOND REPLY BRIEF

Responsive to the second Examiner's Answer dated November 28, 2003, it is initially noted that there is no rebuttal as to Issues 1 and 3 and it is therefore assumed that the Examiner has withdrawn the objection and rejection as set forth in the final rejection. Accordingly, Issues 2 and 4 remain in this appeal.

Claim 10 was rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement, the Examiner alleging that "[t]here is no support in the application for source/drain regions each disposed adjacent to and aligned with the silicide layer disposed on the sidewalls".

With reference to Issue 2, it has been clearly demonstrated in the Brief on Appeal that there is support for the alleged unsupported subject matter. The Examiner's Answer states that,

> "after formation of the metal silicide layer 60, due to the reaction (movement) between silicon atoms of the polysilicon gate 20 near the gate sidewalls with metal atoms of the metal layer 50 to form the metal silicide layer 60, the boundary between the polysilicon gate 20 and the metal silicide layer (of the gate sidewalls) has shifted. In other words, the boundary or the gate sidewalls have moved inward to the gate center because a portion of the polysilicon gate near the metal layer has been consumed and converted into metal silicide during the annealing (heating) process. Therefore, the location of the gate sidewalls immediately after the silicide layer formed is unknown and undetermined. Furthermore, the specification also discloses the dispersing of the dopants in step 155 which would make it apparent to one having ordinary skill in the art that the source/drain regions 80 in the final structure of Fig. 2D would be diffused further under the gate and the boundary of the source/drain regions 80 with the channel region would also be shifted. As a result, after the formation of the metal silicide layer 60, because of the movement at two locations, at the gate sidewalls and the source/drain regions in the substrate, source/drain regions 80 in the final structure are no longer aligned and are not aligned with the silicide layer."

While dopant does move when sufficient heat is applied thereto, this is not the issue. The issue is whether the language of claim 10 is supported by the disclosure as filed. The language in question is "said source/drain regions each disposed adjacent to and aligned with said silicide layer disposed on said sidewalls". It should be noted that while the dopant may disperse in the lateral direction, this dispersal is de minimus, otherwise it would engulf the LDD 70 which still is shown as remaining after silicide formation 60 from the metal 50. It should be noted that the degree of dopant dispersal is based upon the dopant itself, temperature and time of anneal, neither of which is set forth in the specification. All that is set forth is the fact that the source/drain regions are aligned with the silicide as shown in Fig. 2D, this substantiating the fact that lateral dispersal of source/drain dopant is, at most, de minimus. Also, the source/drain regions are formed, as stated at page 8, lines 3 to 11, after

conformal deposition of a metal 50 with subsequent implantation of the source/drain areas 80, it being "noted that the conformal metal on the sidewalls of the gate acts to mask that portion of the substrate from receiving this implant". In other words, the source/drain regions are aligned with the metal 50. It follows that claim 10 is readable on the specification as filed.

With reference to Issue 4, the Examiner's Answer has now changed the rejection by eliminating Tada. In addition to the argument presented in the Brief on Appeal, it is noted that claims 8 and 9 require, in addition to the lateral growth (element (c)), a unitary electrically conductive metallic material entirely covering the sidewalls and top surface of the gate. No such combined structure is taught or suggested by Arai or Watabe et al. The Examiner's Answer attempts to overcome this deficiency by stating that the references can be combined though there is no teaching or suggestion in either reference to form the combination as claimed. As stated in the specification in the very first paragraph, the invention resides primarily in its application to silicided polysilicon gates. The advantages of the structure as claimed are set forth at page 5 and include increased gate conductivity; additional control over gate corner profiles, additional control over gate electric fields and additional control over silicided gate structures, this being accomplished using conventional processes. Since the claims herein are restricted to "silicided polysilicon gates" as stated in the first paragraph of the specification, and since Arai does not teach or even suggest a silicided polysilicon gate structure, any combination with Arai of a reference showing a silicided polysilicon gate could only be suggested by the subject disclosure and for no other reason. Clearly, there is nothing in Watabe et al. to suggest the combination other than the fact that Watabe et al. discloses a silicided polysilicon gate structure.

For the reasons stated above as well as in the Brief on Appeal, reversal of the final rejection and allowance of the claims on appeal is urged that justice be done in the premises.

Respectfully submitted,

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